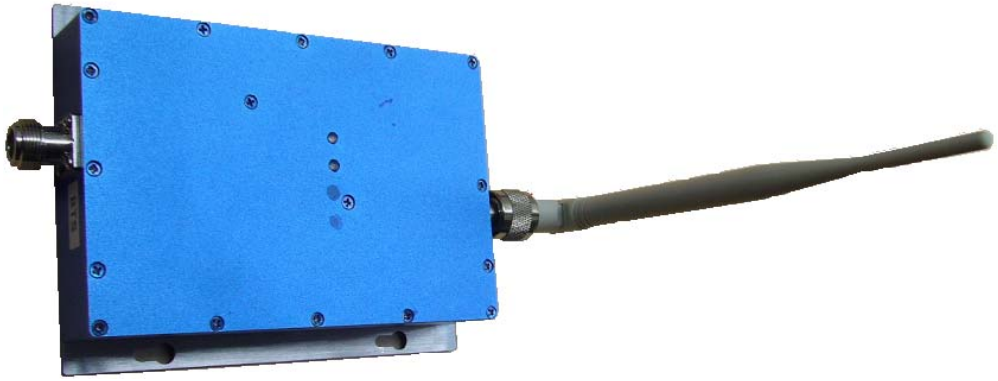
User Manual



2012 August

Information in this manual is subject to change without notice

Table of Contents

1 Description 3
2 Technical Specifications 4
3 System Diagram 5
4 Product Features 6
5 Applications Example 6
5.1 Minimum Signal Levels 7
5.2 How to check your signal levels 7
5.3 Custom Applications 8
5.4 Isolation and Separation 8
6 Production Operation 8
6.1 Notices 8
6.2 Installation 9

Important Notice:

Don't power on Power supply for repeater before donor and service antenna connects to repeater.

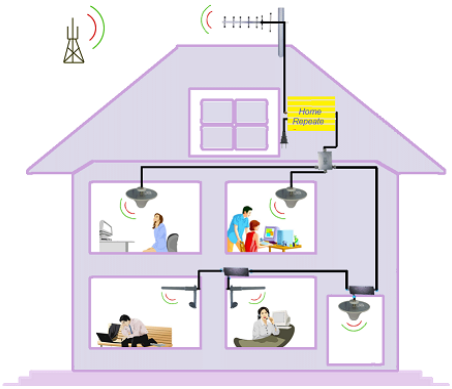
1 Description

The wide dual band booster (PODRP13/CIT) is a bi-directional amplifier used to enhance signals between a mobile and a base station. This repeater type is used for digital telecommunication system:

1) -It picks up the strongest signal from BTS via the Donor Antenna,
2) -Linearly amplifies the signal and then retransmits it via the Indoor Signal Distribution System to the weak/blind coverage area.
3) -And the mobile signal is also amplified and retransmitted to the BTS via the opposite direction.

It is commonly used in the area there are two type of mobile network, such as GSM/CDMA, GSM/DCS, and GSM/UMTS. It will reduce site deployment cost by using one dual band donor antenna, one dual band service antenna, and dual band repeaters in one enclosure.

It is applied to small, medium-size areas such as ***offices***, ***shops***, ***basements***, and ***remote countryside*** etc.



This model booster is commonly used in situations where large numbers of frequency carriers are to be repeated or when base station synthesized frequency hopping is used.

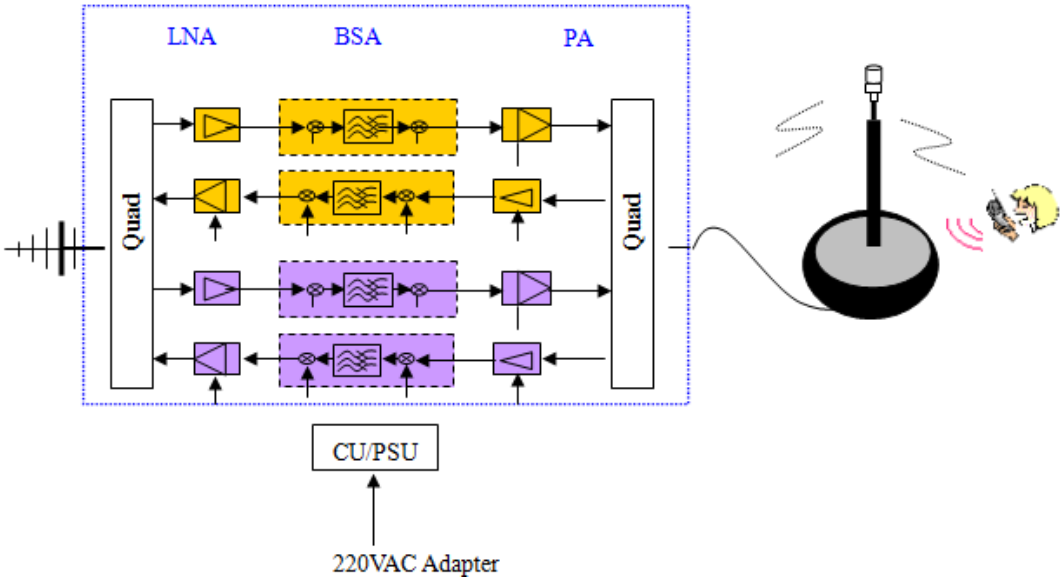
This model booster does not separate out specific carriers but amplify and retransmit all signals within a defined frequency band. Inter-modulation distortion caused by band selective repeaters usually means that lower output power per carrier can be realized compared to channel selective repeaters.

2 Technical Specifications

		Band A	Band B
Network(Customized)		850	1900
Gain	**Uplink**	55±2dB	55±2dB
	Downlink	70±2dB	70±2dB
Output Power	**Uplink**	24±2dBm	24±2dBm
	Downlink	13±2dBm	13±2dBm
Gain Adjust Scope		MGC≥30	
Gain Adjust Step		1dB	
Gain Adjust precision		0～10dB/±1dB#10～20dB/±1.5dB#20～31dB/±2dB	
Band Ripple		±4	
ALC Scope		20dB	
Frequency Error		≤±0.05	
I/O Impedance		50Ω/N connector	
VSWR		≤1.5	
Noise figure		≤8	
Spurious Emission		≤-36dBm@9KHz～1GHz/≤-30dBm@1～12.75GHz	
IM3		-40dBc	
Delay		≤0.5μs	
Max Input Power Level(1minute)		-10dBm	
RF Connector		N-Type (Female)	
Temperature Range		Operation: -25°C ~ + 55°C;Storage: -30°C ~ +60°C	
Relative humidity		5~95% RH	
Power Supply(Customized)		AC/100V~240V 50/60Hz	
Power Supply Socket(Customized)		Connector Type C	
Dimensions		190×120×30mm	
Weight		1.0kg	
Shipment Dimensions		240mm×160mm×50mm	
Shipment Weight		1.2kg	
Indicator	**Power Run**	- Green Light on	
	RF Output Power	- Alarm: Red Light on	

3 System Diagram

The RF link (donor) towards the base station is typically fed from an outdoor antenna while the coverage area is fed by an indoor antenna

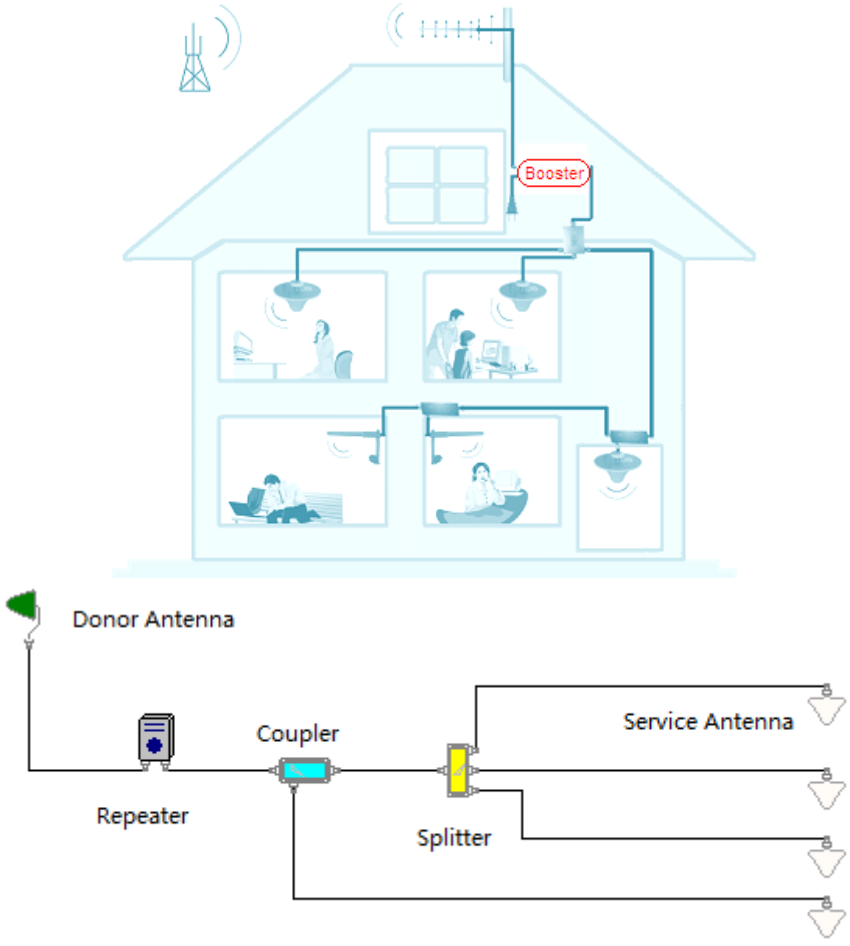


- The signal from the base station is received via the **Dual band Donor antenna**, then forwarded through a **Quad filter (QPX)**, is amplified in a **low noise amplifier (LNA),** and enters the **band selective amplifier board** (BSA).
- The first mixer stage on the BSA amplifier board, which is controlled by a synthesizer, converts the received frequency down to the IF frequency. The signal is then filtered by an **IF SAW band-pass filter** and amplified before it is fed to the second mixer stage, controlled by the same synthesizer as the previous one, for converting back to the original frequency.
- The output signal from the mixer is then amplified in the power amplifier, which is controlled by the **CU**(Control Unit board).The output signal passes a **Quad filter** (QPX), before it is fed to the **Dual band MS antenna** which retransmits the signal at the same frequency to the aim areas.

4 *Product Features*

- Light weight, small dimensions, easy to install
- Easy set DL/UL gain via local PIN switch manually for PO20E type, Gain adjustment of uplink and downlink; gain adjust step is 1dB and the adjust scope is 30dB.
- Smart Automatic Level Control (**ALC**) to reduce interference to BTS
- **Linear p**ower amplification to effectively suppress inter-modulation and spurious emission
- An alarm interface with unique **color LEDs** to indicate power supply and signal level of uplink and downlink
- Simple installation with external **AC/DC adapter**
- Dual ports and full duplex design

5 *Applications Example*



1) The signal strength (includes donor antenna) from donor BTS must be 5dB larger than from neighbor BTS lists and signal level>-50dBm, so the repeater can amplifier in high efficiency with full output power.

2) The donor antenna should have line of sight (LOS) with the BTS antenna. If the signal strength is adequate, LOS may in some cases not be necessary.

3) Donor antenna gains are typically 9 to 14 dB, and have a horizontal and vertical beam width of less than 30° to correctly select the donor BTS.

4) There is large physical separation between the antennas in order to prevent degradation of signal quality and risk of oscillation (Antenna isolation). Ways to achieve this can be usage of highly directional antennas with good front-to-back interference ratio or external shielding between the antennas (For example, your building has a metal roof and you install the Donor antenna above the roof and the Coverage antenna below the roof.). Another option is to use a Frequency Translating Repeater or ICS repeater.

5.1 Minimum Signal Levels

You must have a minimum signal level in the place where you would install the Donor antenna. Failure to provide sufficient input signal will only result in a poor coverage inside the building for this repeater system.

5.2 How to check your signal levels

To check your signal levels, use the phone in the place where antenna be install (on the roof) and observe the signal bars on the phone. It is also helpful to be on a call for immediate registration of the signal/reception. Carefully walk around the roof with the phone to see where the signal is best. The Donor (outside) antenna should be placed in the location where you get the most signal.

	5 Bars	4 Bars	3 Bars	2 Bars	1 Bars
NOKIA	NONE	>-85dBm	-85~-90dBm	-90~-95dBm	-95~-100dBm
Anycall	>-85dBm	-85~-90dBm	-90~-95dBm	-95~-100dBm	-100~-105dBm

Motorola	>-80dBm	-80~-90dBm	-90~-95dBm	-95~-100dBm	-100~-105dBm
Simens	NONE	>-70dBm	-70~-80dBm	-80~-90dBm	-90~-100dBm
PHILIPS	NONE	>-80dBm	-80~-90dBm	-90~-100dBm	-100~-110dBm
Errison	>-75dBm	-75~-85dBm	-85~-90dBm	-90~-95dBm	-95~-105dBm
SAGEM	>-80dBm	-80~-90dBm	-90~-95dBm	-95~-105dBm	-110~-105dBm

It is important to investigate and understand what is causing your reception difficulties. If your building is made of concrete, steel, steel roof, copper roof, brick, aluminum siding, concrete roofing tiles, metal roofing tiles or any other signal stopping material, a repeater is usually the ideal solution for your situation. Signal outside is 3-5 bars and falls off when you enter the building. This is an indicator that the building is the problem and a repeater system will usually solve that problem by bringing that reception from the outside to cover the inside of your building.

5.3 Custom Applications

Most homes or buildings are easily covered by one of our base repeater systems. Some buildings are larger or have multiple areas inside that need coverage.

You may need longer cables, more than 2 coverage antennas or other items in order to fully cover your building. We can make (almost) any cable length and can help design a system that fits your application.

5.4 Isolation and Separation

Isolation refers to the proper distance or separation needed to keep the Donor antenna signal pattern and the Coverage antenna signal pattern away from each other.

Isolation becomes particularly problematic when Omni-directional antennas are used for both the Donor and the Coverage antennas. Since these antennas transmit in a circle (or more accurately a sphere) it is very easy for these spheres to overlap and thus negate the repeater system.

6 Production Operation

6.1 Notices

Follow below safety items carefully before installation, implementation, maintenance and operation for this product

- Repeater amplifies BTS uplink and downlink signal, it can extend BTS coverage area in downlink, but also effect BTS receive sensitivities in uplink.
- BS and MS port must be connected to donor antenna and service antenna when powers supply on; otherwise the equipment will be damage for long term use.
- When use repeater for outdoor, the distance between donor antenna and service antenna must be >20metes, otherwise the repeater will be damage because isolation problem for long term use.
- The power adaptor output is **5Vdc 4A, please use right adaptor**
- Donor antenna need to be lighting proof and lighting rod need to be install for donor antenna installation pole outside
- Check input power, require input power less than maximum input power of repeater, otherwise the repeater cannot work well.
- Keep clear for label and indicator on surface of repeater to be identified.

6.2 Installation

Installing a repeater system is really quite simple. The most difficult task in installing the system is running the cable and does connectors.

Step 1: Start by taking your phone up to the roof or other location outside to find where the signal is strongest.

Step 2: Temporarily mount the Donor (outside) antenna in that location. You may need to adjust and move the antenna later.

Step 3: Run coaxial cable into the building to a convenient location where you can also get standard 220VAC power for the repeater.

Step 4: Place the repeater in that location and connect the coaxial cable to the Donor Side of the repeater and the donor antenna.

Step 5: Mount your coverage (inside) antenna in a productive location. You may need to adjust or move the antenna later.

Step 6: Connect coaxial cable between the coverage antenna and the repeater output port.

Step 7: Power up the system and check for signal inside the building. If needed, tune system by moving and or pointing the Donor and Coverage antennas until they get the most signal possible.

Step 8: Secure all antennas and cables, securely mount the repeater and clean up the installation.